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Factsheet

EQUINE INFECTIOUS ANEMIA
(Swamp Fever)

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Equine infectious anemia (EIA), also known as Swamp Fever, is a virus disease known to occur in all members of equidae, including horses, mules and donkeys. This virus has the unique capability of infecting the horse for life, producing intermittent attacks of illness (during which the horse may die) followed by periods during which the horse may appear normal.

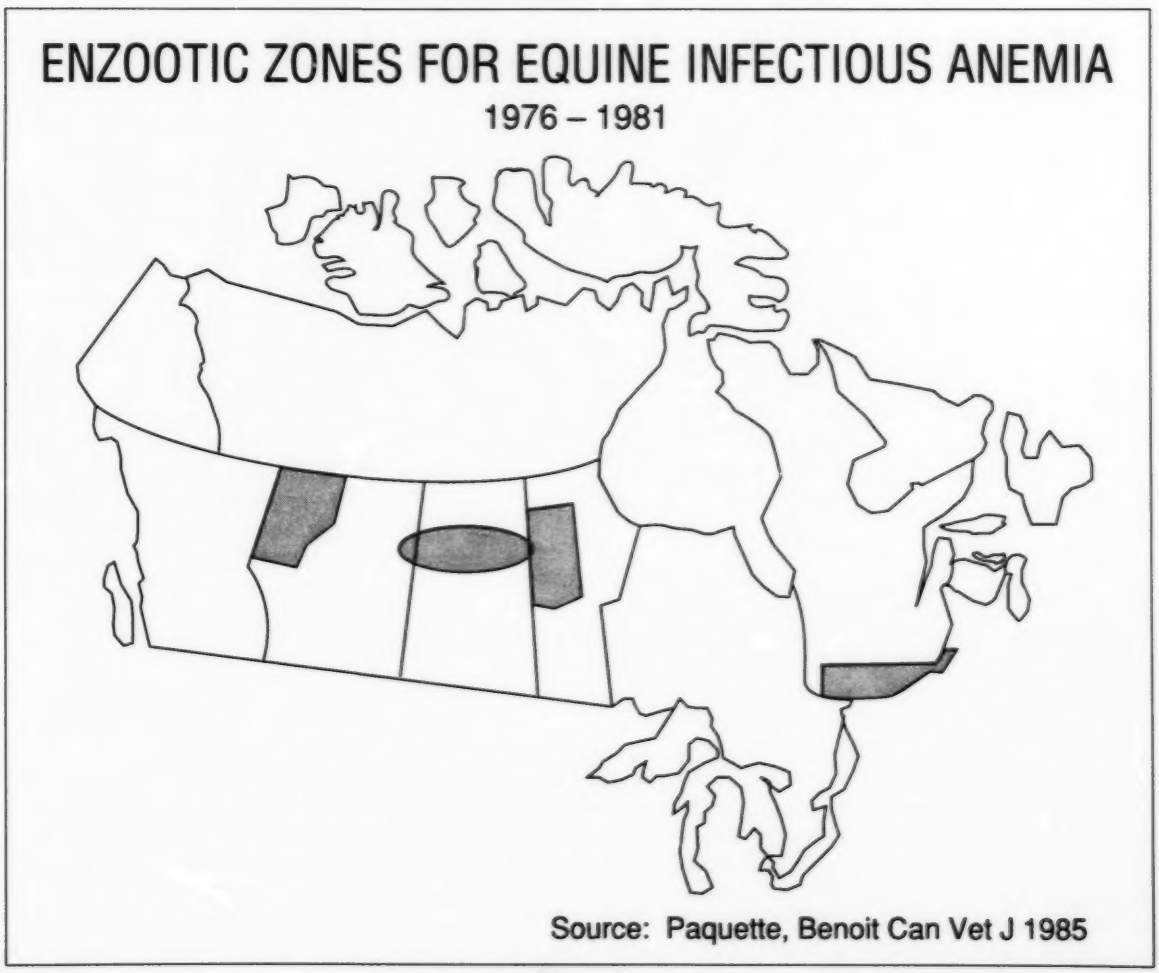

Figure 1

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Occurrence

The disease has been diagnosed in many areas of the world and the infection may exist worldwide.

Canada

In Canada, the disease was first reported in Manitoba in 1881. The distribution of EIA reactors in Canada from January 1976 to December 1981 is shown in Figure I. This information is based on the present voluntary program, whereby owners elect to test their horses. Since EIA is a reportable disease, all suspect cases must be reported to Agriculture Canada.

Five highly enzootic areas (areas where EIA is present in the horse population at all times) are listed here in decreasing order of concentration; Northwestern Alberta, Central Saskatchewan, the Eastern Townships in Quebec, the Ottawa Valley and West-central Manitoba. Sporadic cases are seen throughout Canada and are usually detected when owners elect to test their horses. In 1987, more than 90,000 horses were tested in Canada for EIA, with 353 classified as reactors. An EIA outbreak in Manitoba accounted for 266 of the 353 reactors reported and most of these were associated with pregnant mare urine (PMU) production farms. More recently, cases have appeared in Hamilton, Ontario (1988). In Ontario, 36,000 to 39,000 horses are tested annually for EIA, with an average of 10 to 12 reactors found among those tested.

United States

The occurrences of EIA are sporadic throughout most of the United States, with the exception of the "insect belt" area of the Gulf of Mexico and southwards. Figure II highlights those states with a positive Coggins' test for 50 or more horses per year.

Transmission of the EIA Virus

The EIA virus is spread mechanically. That is, blood, containing the virus has to be transmitted from an infected horse to a susceptible horse by a vector, such as an insect, infected syringes, needles or surgical equipment. The virus can cross the placental barrier and cause fetal infection and a symptomatic stallion car infect healthy mares during breeding.

(a) Insect Vectors

The EIA virus is mechanically transmitted from one horse to another by the bloodsucking horse flies, deer flies (Tabanids), stable flies (Stomoxys spp.), mosquitoes and possibly midges. For transmission of the EIA virus to occur, the horse fly (vector) must first find and begin feeding on an infected horse, be interrupted in its feeding, and then transfer the virus during a subsequent feeding on a susceptible horse. Feeding must occur within a short period of time. Tabanids' large size and noisy flight attract attention and their cutting/slashing mouthparts inflict considerable pain, therefore, their feeding is frequently interrupted. Research has indicated that the EIA virus can be transmitted up to 30 minutes after the first feeding, however, transmission after 4 hours was unsuccessful.

Horse flies may have a home range or flight distance of up to 4 miles and therefore, in Canada, permanent quarantine requires complete isolation in a fly proof building.

(b) Placental Barrier

The virus apparently can cross the placental barrier and cause fetal infection. Mares with signs of acute EIA during pregnancy run the greatest risk of carrying infected fetuses. Infected fetuses can be aborted or be born alive "virus positive" and possibly be a seropositive virus carrier. The fetal response may be related to the age of the fetus at the time of the virus infection.

(c) Other Vectors and Factors Affecting Virus Transmission

The trading of horses and the indiscriminate use of non-disposable hypodermic needles, teeth floats, gags, nose twitches and stomach tubes all contribute to the spread of the EIA virus. During the fall when horses are changing hands, the spread of the disease is more prevalent.

EIA Virus Characteristics

The EIA virus is a slow acting virus of the lenti-retrovirus group. Retroviruses cause leukemia in cats, mice and cattle, arthritis, pneumonia and neurologic diseases in small ruminants and acquired immune deficiency syndrome (AIDS) in humans. These viruses localize and multiply in macrophages of many organs, especially in the spleen, liver, kidney, and lymph nodes, where they take over the cell and sit and wait to become activated. Upon activation, the cell reproduces more virus, which bursts free from the cell to infect other cells. This causes recurring cycles, in which the horse seems normal and then ill.

A major difficulty in developing a vaccine for EIA, is the capacity of the virus to vary antigenically, meaning, the virus changes its protein make-up, making successful antibody development difficult. Therefore, an effective vaccine must protect the horse against all of the variants to which it will be exposed. Research is underway to develop a vaccine for EIA. In light of the concerns over AIDS and an interest in using the EIA virus as a model, there could be significant advances in the development of a vaccine.

Clinical Disease

Following the first exposure to the virus, acute cases experience fever and hemorrhaging 7-30 days post infection. Very few horses with this initial fever are detected by owners. The more classical case of EIA is that of a chronically infected horse. These animals experience episodes of fever, weight loss, depression, progressive weakness, anemia and edema. These signs occur every two weeks in recurring cycles.

Other symptoms which may occur during the course of the disease include: loss of appetite, frequent urination,

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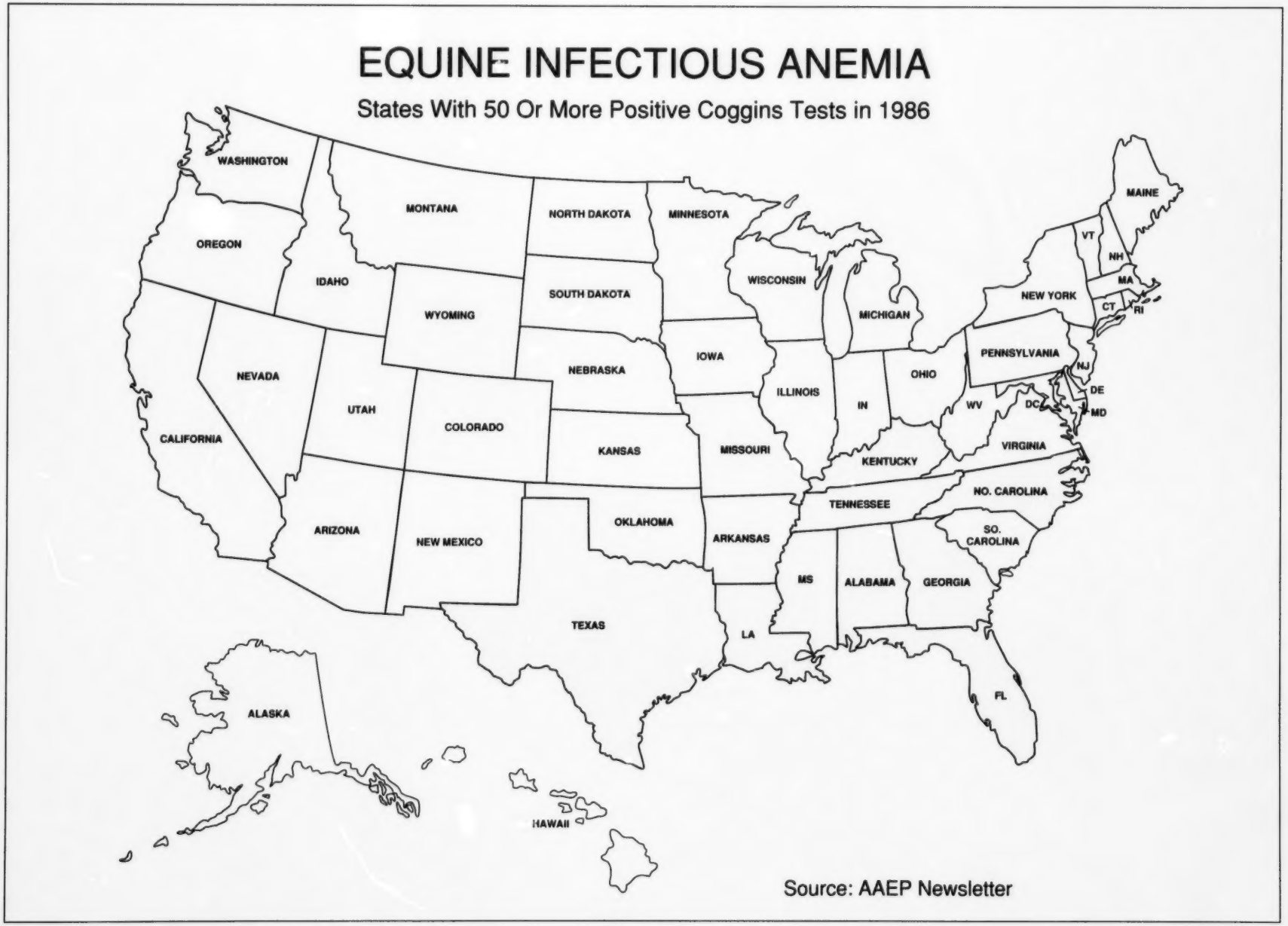
EQUINE INFECTIOUS ANEMIA
States With 50 Or More Positive Coggins Tests in 1986
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LA
WISCONSIN
ILLINOIS
MICHIGAN
IN
OHIO
KENTUCKY
TENNESSEE
MS
ALABAMA
GEORGIA
FL
SO. CAROLINA
NO. CAROLINA
VIRGINIA
WV
PENNSYLVANIA
NEW YORK
MAINE
VT
NH
MA
CT
RI
NJ
DE
MD
DC
ALASKA
HAWAII
Source: AAEP Newsletter

Figure II

diarrhea, weakness, paralysis of the hindquarters, paleness of the mucous membranes, yellowish discoloration of the conjunctiva, small pinpoint hemorrhages beneath the tongue, rapid breathing and accelerated pulse. Pregnant mares may abort.

The onset of these signs is often associated with stresses such as hard work, hot weather, racing, pregnancy or use of steroid drugs. The most difficult animals to identify are the inapparent carriers. These horses show no clinical signs associated with the infection and go undetected unless subjected to the Coggins' blood test.

On occasion, an apparently healthy horse may harbor the virus, but never exhibit any symptoms of the disease. This is referred to as a carrier animal and is a constant source of infection.

Treatment and Prevention

There is no known treatment that can eliminate the virus from the body. To date there are no satisfactory vaccines for EIA.

The key to prevention is the identification and control of infected horses. An eradication program would be only possible, if all members of the equine population were tested, and infected horses euthanized, or placed under complete permanent quarantine in a fly proof building.

Regulations

EIA is a reportable disease and subject to control under the Animal Disease and Protection Act and Regulations administered by the Health of Animals Division of Agriculture Canada. The voluntary control program was initiated in 1972. Private veterinarians accredited by Agriculture Canada, collect blood samples and submit them to accredited laboratories. All results are reported to Agriculture Canada. Positive or atypical reactions to the Coggins' test will be investigated by Agriculture Canada.

Once a suspect horse has been identified, an Agriculture Canada veterinarian will assume full control of the case. The owner will be advised that a free retest can be run at his or her request. Upon identification of a positive retest, the premise where the reactor is housed is quarantined. The reactor horse is identified by applying a cold "R" brand on a clipped area of the right shoulder. The owner has the option to have the horse

(a) euthanized on the premises with compensation;
(b) euthanized at a registered establishment with compensation; or
(c) placed into permanent quarantine with no compensation.

Coggins' Test

The Coggins' test is an agar gel diffusion (AGID) test, which is a practical diagnostic test for identifying horses infected with EIA. This test is used to detect the EIA antibody.

It requires that blood samples be drawn from suspect horses or those horses which are being tested. Serum is the blood component used in the test.

False positive AGID test reactions are observed in the sera of foals which have received colostrum from infected mares, but the maternal antibody is lost by 4-6 months of age. Foals reacting to the AGID test are, therefore, routinely retested after 6 months of age to confirm whether the antibody detected was passively (maternal) or actively acquired.

False negative AGID test reactions are observed in horses which have been infected and have not developed an antibody response. When a horse is suffering from an acute episode of EIA, the level of viremia present, is sufficient to bind the available serum antibody together, making it impossible to detect, which will in turn, produce false negative AGID test reactions.

In general, the Coggins' test has been useful in controlling the spread of EIA and has helped to reduce the number of infected horses in this country.

Control

Horse owners can help control the spread of EIA by:

1. Subjecting their horse(s) to the Coggins' test for EIA annually.
2. Requiring a negative Coggins' Test certificate to accompany all horses entering boarding stables, fairs, shows and race tracks.
3. Not allowing their horse(s) to come in close contact with horses of questionable health status.
4. Controlling biting flies and mosquitoes by developing a fly control procedure around the stable.
5. Using disposable hypodermic needles to prevent the spread of the virus.
6. Cleaning and sterilizing all instruments by boiling for 15 minutes prior to reusing.
7. Avoiding the practice of interchanging equipment such as bridles, saddles, brushes and bandages from one animal to another.
8. Removing reactors promptly as directed by Agriculture Canada and cleaning and disinfecting the stable and surroundings.

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